

SEASONAL SNOW SURVEY AND STREAM FLOW FORECAST

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The winter of 1927-28 has been unusual in many respects. The precipitation at Logan for the months of October, December, January and February was considerably below normal while November and March, the other two winter months, were just slightly above normal. The normal precipitation for the six months, October to March, inclusive, is 9.46 inches. The precipitation for 1927-28 during the same period was 7.3 inches or 78 percent of normal.

The winter was marked by an open fall during which the ranges became well saturated with moisture. Considerable snow fell during early December which was followed by a period of low temperatures. A heavy thaw set in about the first week of January followed by another cold spell and a thaw during the fore part of February. These alternate freezing and thawing spells served to compact the snow cover in spite of the absence of drifting winds.

The snow fall in the mountains during the months of December and January was approximately normal but the February fall was very deficient. The month of March pile a lot of snow up in the mountains but it was not sufficient to overcome the February shortage and as a result the snow cover on April 1 was below normal. A survey of the snow on the Logan drainage indicates a fairly heavy snow cover in fact it is almost identical with that of 1924-25.

The snow survey was made April 5 to 10, 1928 and covered the area from Franklin Basin on the north to St. Louis on the south. At Franklin Basin the snow averaged 31 inches in depth containing 31.7 inches of water, the snow having a density of 29.1 percent. The elevation of this station is 7900-8100 feet. At Tony Grove Lake about 15 miles south of Franklin Basin

and at elevation 8300-8600 feet the depth and water content of the snow cover is a little greater, being 86.8 inches deep and containing 34.3 inches of water. The density here averaged 40 percent. The Mt. Logan course is about 8700 feet high and 25 miles south of Tony Grove Lake. The depth of snow over this course averaged 81 inches containing 32 inches of water.

The low courses at Tony Grove R. S. and Mud Flat are not figured in the averaged from which the forecasts are made because they are affected by winter melting. The snow cover below 6000 feet is very light containing only about 2 inches of water at Tony Grove R. S. and 8.5 inches at Mud Flat where the elevation is about 6500 feet.

There has been no winter melting above 7000 feet even though the warm weather the last of March caused a sudden rise in the streams; especially the Blacksmith Fork and the Little Bear River. Rick's Spring went dry last fall and is still dry further confirming the fact that no winter melting occurred from the higher snows.

Table I shows the accumulated precipitation at Logan and the accumulated snow cover at Franklin Basin, Tony Grove Lake and Mt. Logan.

Course	Elevation	1924		1925		1926		1927		1928	
Course		Depth. H ₂ O Snow .in	in	Depth. H ₂ O Snow .in	in	Depth. H ₂ O Snow .in	in	Depth. H ₂ O Snow .in	in	Depth. H ₂ O Snow .in	in
Franklin Basin	7900-8100	71.5	25.8	67.0	28.4	52.0	18.4	36.0	33.8	31.0	31.2
Tony Grove Lake	7300-8600	77.6	31.8	72.6	35.6	59.0	22.0	108.0	43.6	86.8	34.3
Mt Logan	8700	80.0	26.2	73.0	31.6	73.0	22.0	112.0	33.0	81.0	32.2
Precipitation at Logan	4780	Oct. 1-Apr. 1		Oct. 1-Apr. 1		Oct. 1-Apr. 1		Oct. 1-Apr. 1		Oct. 1-Apr. 1	
		6.83		8.78		7.73		8.38		7.30	

The above table shows the snow cover this year to be about 110 percent of the four year normal.

The average discharge during the period April 1 to October 1 from the Logan River based on 30 years record is about 173,000 acre feet. The average discharge during the past four years is 121,300 acre feet. A study of the runoff characteristics on the Logan and the Blacksmith Fork Rivers indicates a very close correlation between the snow cover and the April-September runoff. Excluding the effect of precipitation and evaporation after the spring survey the relation between the snow cover and runoff on the Logan and Blacksmith Fork areas can be expressed approximately by the following equations.

$$R = .985 S + 23 \quad \dots \quad \text{Logan River.}$$

$$R = .4855 S + 4 \quad \dots \quad \text{Blacksmith Fork River.}$$

Where: R = Runoff in 1000's acre feet, April-September, incl.

S = Snow cover above 8000' in percent of normal.

The actual discharge may vary as much as five percent either way from that indicated by the above equations due to abnormal precipitation, temperature or evaporation during the spring and early summer.

The snow survey shows a snow cover above 8000 feet 110 percent of the last four years normal. The April-September discharge based on the above relationships should then be :

Logan River : 131,350 \pm 7,000

Blacksmith Fork River . . 57,350 \pm 3,000

The watershed conditions this year are very similar to those in 1925 and everything points to a similar season. The water shortage was not noticed that year because of extra-heavy summer precipitation. The water supply situation this year is not serious but if the spring and summer precipitation happens to be below normal a water shortage will probably result.